STATUS OF CLAIMS

Claims 1 - 20 are pending.

Claims 1 – 20 stand rejected.

Claims 1, 7, 13 and 18 have been amended without prejudice herein.

REMARKS

Reconsideration of the subject application is respectfully requested.

Claim Objections

Claim 13 has been amended to correct the inadvertent typographical error identified by the Examiner.

35 U.S.C. 112, Second Paragraph Rejections

Claims 7, 18 and 19 stand rejected pursuant to 35 U.S.C. 112, second paragraph, as failing to particularly point out and distinctly claim the subject matter Applicant regards as the invention. Claim 7 stands objected to as lacking a proper antecedent basis for "said second wafer." Applicant has amended Claim 7 to depend from Claim 4. Claims 18 and 19 stand objected to because it is unclear where the "predetermined reaction sites" are. Applicant has amended Claim 18 to clearly recite "having dangling bonds at intersections of at least two of said channels and providing localized reaction sites for receiving the organic molecules." By way of non-limiting example only, support for this limitation may be found in the specification on page 6, lines 7 – 14, wherein it recites:

> It is also envisioned that there will be an X-Y matrix of microtubes whereby each of the microtubes form an X-Y grid and therefore fluids can be injected at any point in X-Y grid to enable a fluid to reach a cross point or a local area. At this local area, there would be a small spot or opening. At this spot, there would be dangling oxygen bonds. These dangling oxygen bonds are, of course, utilized to enable one now to couple organic molecule to the dangling oxygen bonds so as to utilize the structure shown in FIGS. 1 and 2 as a template for connecting organic molecules to the silicon structure.

Accordingly, Applicant respectfully requests reconsideration and removal of these 35 U.S.C. 112 second paragraph rejections.

Request For Withdrawal of Final Office Action

Should a notice of allowance not be forthcoming, for at least the reasons set forth herein, Applicant respectfully requests the finality of the outstanding Office action be withdrawn and a new, non-advisory, non-final Office action be issued in the present application. Applicant respectfully submits the grounds of rejection for each of the claims are sufficiently indefinite such that Applicant has not been afforded a reasonable opportunity to evaluate and respond to the outstanding rejection of each claim. Indeed, the office action is ambiguous as to the grounds for rejecting each of the claims, due at least in part to mistaken claim identifications in the outstanding Office action. Regardless, for purposes of expediting prosecution of the present Application, Applicant has endeavored to address what he believes to be the outstanding rejections.

For example, Item 4 on page 2 of the present office action states Claims 1, 8 and 9 stand rejected under 35 U.S.C. 102(b) as being anticipated by Little (United States Patent No. 4,392,362). However, the very next sentence on page 3 of the office action identifies claims 1, 8, 9, 18 and 19 relative to Little. Page 4 of the office action further

identifies claims 2 and 3 (line 7), claims 4 and 7 (line 9) and claims 6 and 10 (lines 12, 14). The examiner further identifies claims 11 and 20 on lines 17-19. Accordingly, Applicant is unsure whether Claims 2, 3, 4, 6, 7, 10, 11, 18, 19 and 20 also stand rejected as being anticipated by Little. Further, Examiner states (Item 5) on page 4 that Claims 1, 4, 11, 12 and 17 stand rejected under 35 U.S.C. 102(b) as being anticipated by Grantham (United States Patent No. 4,467,394). However, again the Examiner identifies additional claims, namely additional claims 7, 8, 9, 18, 19 and 20 on page 5 of the office action relative to Grantham. Accordingly, Applicant is unsure whether these additional Claims also stand rejected as being anticipated by Grantham. Finally, while Claims 5 and 13 stand rejected under 35 U.S.C. 103(a) as being unpatentable over Little in view of Ashmead (United States Patent No. 6,690,763), see page 6, Item 8, Applicant is unsure as to whether Claim 16 stands rejected as being unpatentable over Grantham in view of Ashmead. For at least the foregoing reasons, withdrawal of the finality of this office action is requested.

35 U.S.C. 102 and 103 Rejections

The above notwithstanding, Applicant respectfully requests reconsideration and removal of all rejections for at least the following reasons. "A claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference." See, M.P.E.P. §2131 citing Verdegaal Bros. v. Union Oil Co. of California, 814 F.2d 628, 631, 2 USPQ2d 1051, 1053 (Fed. Cir. 1987). Applicant respectfully submits the cited art fails to teach or suggest each of the recited limitations of any of the Claims – and hence fails to anticipate any of the pending Claims.

1. Little Fails to Anticipate Claim 1

In the previous Amendment and Response, Applicant argued the Little device is not a miniature reaction chamber template structure, no less a miniature reaction chamber template structure for fabricating nanoscale molecular systems and devices, as is recited by Claim 1. Further, the Little reference merely teaches a microminiature cryogenic device for cooling in the milliwatt range (e.g., a miniature refrigerator).

In response, the Office action argues that the phrase "miniature reaction chamber template structure for fabrication ... [does not] impart any structural difference from the apparatus of Little." The office action further argues that Little discloses all of the structure recited after the pre-amble. Finally, the office action asserts that the intended use of a device is not patentable if all of the elements are known.

In response, Applicant respectfully brings to the Examiner's attention that any terminology in the preamble that limits the structure of the claimed invention must be treated as a claim limitation. *See, e.g., Corning Glass Works v. Sumitomo Elec. U.S.A., Inc., 868 F.2d 1251, 1257 9 USPQ2d 1962, 1966 (Fed. Cir. 1989).* Claim 1, as originally filed, did not merely recite a device that may be suitable for fabrication of nanoscale molecular systems and devices, but rather clearly claimed a "miniature reaction chamber template structure". The determination as to whether Applicant's original recitation of a template structure is a structural limitation can only be properly resolved by reviewing the application in its entirety "to gain an understanding of what the inventors actually invented and intended to encompass by the claim." *See, e.g., Pac-Tec, Inc. v. Amerace Corp., 903 F.2d 796, 801, 14 USPQ2d 1871, 1876 (Fed. Cir.*

1990). Applicant submits it is clear from the application, as a whole, that Applicant invented and intended to claim a nanoscale molecular system fabricating template structure *(see, e.g., Title; see also, e.g., par. 4, "It is an objective to provide a unique micro-miniature template structure"; see also, e.g., that all original claims recited a template structure).*

Accordingly, Applicant submits the Office action fails to properly weigh the original Claim 1 recitation of a template structure. Further, when this recitation is afforded its proper weight as a structural limitation, Claim 1 is patentably distinct over the prior art of record for at least the reasons previously set forth.

However, in order to expedite prosecution of the present application, Applicant has amended Claim 1 to more clearly recite structural aspects of the present invention. Applicant submits this is not a narrowing amendment, and subject matter has not been surrendered, for at least the reasons set forth above. Amended Claim 1 recites:

> A miniature reaction chamber template structure for fabricating *a nanoscale molecular system*, comprising:
> a first wafer of silicon,
> a layer of borosilicate glass having oxygen ions at a surface thereof and being at least substantially adjacent to said wafer of silicon to form a composite structure, and
> *a plurality of channels, located between said glass and silicon interface, defining a plurality of reaction sites where said channels intersect and having dangling bonds for coupling to organic molecules to fabricate the nanoscale molecular system*, and
> an inlet opening for said channels at one end of said structure and an outlet opening for said channels at another end of said structure to enable the *insertion of a fluid containing the organic molecules* in said channels.

Accordingly, amended Claim 1 clearly recites a template structure including channels that define reaction sites where they intersect and have dangling bonds for

coupling to organic molecules to fabricate a nanoscale molecular system, as is explicitly recited in the preamble and body of Claim 1. Little fails to anticipate present Claim 1, at least by virtue that it fails to teach "[a] miniature reaction chamber template structure for fabricating a nanoscale molecular system" comprising "a plurality of channels, located between said glass and silicon interface, defining a plurality of reaction sites where said channels intersect and having dangling bonds for coupling to organic molecules to fabricate the nanoscale molecular system", but rather merely teaches a refrigerator.

2. Grantham Fails to Anticipate Claim 1

The Grantham reference, like Little also fails to teach or suggest a miniature reaction chamber template structure recited in present claim 1. Rather, Grantham merely teaches a pressure transducer. Accordingly, Applicant traverses the rejection over Grantham for at least those reasons set forth above with respect to Little.

By way of further non-limiting example only, Grantham further fails to teach the limitation of an inlet opening for channels. Claim 1 recites, in part, a plurality of channels, and an inlet opening for said channels. The Office action argues Grantham discloses a plurality of channels (22) that would inherently have inlets and outlets. (*See, 12/15/2004 Office action, par. 5).* However, a detailed reading of Grantham reveals that the reference neither discloses nor suggests such features and limitations.

First, Grantham teaches only a single well 22. *See, e.g., Col. 4, lines 14-17 ("FIG. 4 illustrates the results of the next steps of forming an aperture, or well, 22 in layer 16, concentric with the plateau 24 surface of the electrode, and sealing this aperture with glass layer 17.").* Further, Grantham expressly teaches well 22 is sealed to form a vacuum chamber, and hence, does not include inlets and/or outlets. *See, e.g., Id; see also, Col. 4, lines 57-61 ("The resulting electrostatic field causes the*

diaphragm and glass layer 17 to attract each other as the current flow through the silicon glass interface provides a seal around the surface 34 to transform the well 22 into a vacuum chamber."). Accordingly, Grantham fails to teach, "a plurality of channels", as well as "a plurality of channels, located between said glass and silicon interface, defining a plurality of reaction sites where said channels intersect and having dangling bonds for coupling to organic molecules to fabricate the nanoscale molecular system" – as is explicitly recited by Claim 1. Further, Grantham clearly fails to teach inlets for vacuum chamber 22, and hence, cannot teach an inlet opening for the claimed plurality of channels at one end of said structure and an outlet opening for said channels at another end of said structure to enable the insertion of a fluid containing the organic molecules in said channels.

Accordingly, Applicant respectfully requests reconsideration and removal of the rejection of Claim 1 in view of Grantham.

3. Little and Grantham Each Fail To Anticipate Claims 2 – 20

Applicant respectfully requests reconsideration and removal of the rejections of Claims 2 – 17 as well, at least by virtue of these Claims' ultimate dependency upon a patentably distinct base Claim 1.

In similar fashion, independent claim 18 analogously recites borosilicate glass having dangling bonds at intersections of at least two channels and providing localized reaction sites for receiving organic molecules recited to be fabricated into a nanoscale molecular system. Claim 18 further recites at least one inlet for the channels for enabling the insertion of a fluid containing the organic molecules to be fabricated into the nanoscale molecular system – thereby providing an apparatus for fabricating a

nanoscale molecular system. None of the cited references of record disclose, teach or suggest the above cited features and limitations of present Claim 18.

Reconsideration and removal of this rejection if requested. Applicant also respectfully requests reconsideration and removal of the rejection of Claim 19, at least least by virtue of this claim's ultimate dependency from a patentably distinct base Claim 18.

Regarding Claim 20, Applicant submits it is similarly distinguishable over the prior art for reasons analogous to Claims 1 and 18. Further, Claim 20 additionally recites, "An apparatus for fabricating nanoscale molecular systems, comprising: ... at least one edge protruding into at least one of said channels and being suitable for inducing a localized high electric field." By way of non-limiting example only, support for this limitation may be found in paragraph 7 of the present application, wherein it teaches, "Moreover, the use of a particular crystallographic plane makes possible the construction of sharp edges for a localized high electric field." And, in paragraph 25 of the present application, wherein it teaches with regard to Fig. 9,

> Each channel has localized high field reaction areas designated by 102 and 103. These high field reaction areas are basically points which are tips which are directed along the apertures as 106 and 104, and which will produce high electric fields where the voltage is applied between the silicon and Pyrex between the wafer. These high electric fields which are produced at the tips will enable the efficient reaction areas to occur at the localized tip areas, plus each of the tips as 102 and 103 terminates in a sharp point. As one can understand, when a voltage is applied between the chips, the sharp points will basically create high voltage fields, which are localized and whereby reactions can take place as indicated above.

As may be seen in Figure 9, each of the protruding tips includes a protruding edge. Applicant submits Little and Grantham also fail to teach edges protruding into at

least one of the channels and being suitable for inducing a localized high electric field – at least by virtue that Little and Grantham teach no such electric fields at all, but merely disclose a miniature refrigerator and pressure transducer, respectively.

CONCLUSION

Wherefore, Applicant believes he has addressed all outstanding grounds raised in the outstanding Office action, and respectfully submits the present case is in condition for allowance, early notification of which is earnestly solicited.

Should there be any questions or outstanding matters, the Examiner is cordially invited and requested to contact Applicant's undersigned attorney at his number listed below.

Respectfully submitted,

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